Patent Claims:

1. A holding device (6) for an optical element (5) in an objective (1), having a mount (4) that is connected, on the one hand, to the objective (1) and, on the other hand, at least indirectly to the optical element (5), there being arranged between the mount (4) and the optical element (5) a reinforcing element (8) whose coefficient of thermal expansion corresponds substantially to the coefficient of thermal expansion of the optical element (5).

2. The holding device as claimed in claim 1, characterized in that a seal or gasket (11) is arranged between the optical element (5) and the reinforcing element (8).

3. The holding device as claimed in claim 1 or 2, characterized in that the reinforcing element (8) and the optical element (5) are composed of the same material.

4. The holding device as claimed in claim 3, characterized in that the reinforcing element (8) and the optical element (5) substantially consist of SiO_2.

5. The holding device as claimed in claim 3, characterized in that the reinforcing element (8) and the optical element (5) substantially consist of CaF_2.

6. The holding device as claimed in any one of the claims 1 - 5, characterized in that the optical element (5) and the reinforcing element (8) are connected to one another by a wrung connection (10).

7. The holding device as claimed in claim 6, characterized in that the optical element (5) and the reinforcing element (8) in each case have substantially flat surfaces in the region of the wrung connection (10).

8. The holding device as claimed in claim 6, characterized in that the optical element (5) and the reinforcing element (8) in each case have spherical surfaces in the region of the wrung connection (10).

9. The holding device as claimed in claim 6, characterized in that the optical element (5) and the reinforcing element (8) in each case have aspheric surfaces in the region of the wrung connection (10).

10. The holding device as claimed in any one of the claims 6 - 9, characterized in that the optical element (5) and/or the reinforcing element (8) are provided with a protective layer (35) in the region of the wrung connection (10).

11. The holding device as claimed in claim 10, characterized in that the protective layer (35) is formed by sol-gel materials.

12. The holding device as claimed in any one of the claims 1 - 5, characterized in that the optical element (5) and the reinforcing element (8) are connected to one another by bonding.

13. The holding device as claimed in any one of the claims 1 - 5, characterized in that the optical element (5) and the

reinforcing element (8) are connected to one another by soldering.

14. The holding device as claimed in any one of the claims 1 - 5, characterized in that the optical element (5) and the reinforcing element (8) are designed in one piece with one another.

15. The holding device as claimed in any one of the claims 1 - 14, characterized in that a seal or gasket (14) is arranged between the mount (4) and the reinforcing element (8).

16. The holding device as claimed in claim 15, characterized in that the seal or gasket (14) is arranged in such a way that contact between the same and an immersion medium (7) is avoided.

17. The holding device as claimed in any one of the claims 1 - 16, characterized in that the reinforcing element (8) is held inside the mount (4) by an isostatic bearing.

18. The holding device as claimed in claim 17, characterized in that the isostatic bearing has a plurality of, preferably three, elastic support points (12) between the reinforcing element (8) and the mount (4).

19. The holding device as claimed in any one of the claims 1 - 18, characterized in that the reinforcing element (8) is fitted on the mount (4) by a plurality of fastening elements (13).

20. The holding device as claimed in claim 19, characterized in that the fastening elements (13) act on the neutral fiber of the reinforcing element (8).

21. The holding device as claimed in any one of the claims 1 - 20, characterized in that at least one elastic decoupling element (17) is arranged between the mount (4) and the reinforcing element (8).

22. The holding device as claimed in claim 21, characterized in that the elastic decoupling element (17) has a plurality of coupling members (19) that rest on a spherical surface (20) of the reinforcing element (8).

23. The holding device as claimed in any one of the claims 1 - 22, characterized in that the optical element is designed as a terminating element (5).

24. An objective having an optical element (5) and having a holding device (6) for the optical element (5) having a mount (4) that is connected, on the one hand, to the objective (1) and, on the other hand, at least indirectly to the optical element (5), there being arranged between the mount (4) and the optical element (5) a reinforcing element (8) whose coefficient of thermal expansion corresponds substantially to the coefficient of thermal expansion of the optical element (5).

25. The objective as claimed in claim 24, which is designed as a lithography objective (1).

26. The objective as claimed in claim 25, said objective being an immersion lithography objective.

27. The objective as claimed in claim 26, characterized in that provided between the optical element (5) and an optical element (3) arranged inside the lithography objective (1) are a feed line (22) for gas or immersion medium, and a removal line (23) for gas or immersion medium.

28. The objective as claimed in claim 26, characterized in that provided between the optical element (5) and an immersion medium (7) are a gas feed line (26) and a gas extraction line (27) to and from an immersion medium space (24).

29. The objective as claimed in any one of the claims 24 - 28, characterized in that a manipulation device (32) is provided by means of which the optical element (5) can be displaced along an optical axis and/or in a plane perpendicular to the optical axis, and/or can be tilted about an axis perpendicular to the optical axis.

30. The objective as claimed in claim 29, characterized in that a measuring system for determining the tilt and/or the decentering and/or the axial position of the optical element (5) is connected to the manipulation device (32).

31. The objective as claimed in claim 30, characterized in that a control loop for controlling the tilt and/or the decentering and/or the axial position of the optical element (5) is provided which has the manipulation device (32), the measuring system and a control device.

32. A lithographic apparatus comprising an illumination system (IL) for providing a projection beam (PB) of radiation, a support structure (MT) for supporting patterning means (MA), a substrate table (WT) for holding a substrate (W), and a projection system (PL) for projecting the patterned beam onto a target portion (C) of the substrate (W), the projection system (PL) comprising an objective (1) having an optical element (5) and having a holding device (6) for the optical element (5) having a mount (4) that is connected, on the one hand, to the objective (1) and, on the other hand, at least indirectly to the optical element (5), there being arranged between the mount (4) and the optical element (5) a reinforcing element (8) whose coefficient of thermal expansion corresponds substantially to the coefficient of thermal expansion of the optical element (5).

33. A method for connecting an optical element (5) and a reinforcing element (8) in an objective (1), in which the optical element (5) and the reinforcing element (8) are connected to one another by wringing.

34. The method as claimed in claim 33, characterized in that respective contact surfaces of the optical element (5) and of the reinforcing element (8) are treated with a chemically activating liquid before wringing and are exposed to a temperature of more than 150° C after the wringing.

35. The method as claimed in claim 34, characterized in that an acid is used as chemically activating liquid.

36. The method as claimed in claim 33, characterized in that a protective layer (35) is provided in the region of the wrung connection (10) at the optical element (5) and/or at the reinforcing element (8).

37. The method as claimed in claim 36, characterized in that the protective layer (35) is applied by a sol-gel method.

38. Method of manufacturing semiconductor components by using a lithography objective according to Claim 32.